Central Puget Sound
Regional Fare Coordination System

Fixed WDOLS Installation Procedure - Kitsap Transit

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Contents

1 Introduction **5**

1.1 Purpose 5
1.2 Scope 5
1.3 Terminology 5
1.4 References 6

2 KT Main Base Installation Instructions **7**

2.1 Fixed WDOLS 1 – Admin Building 7
  2.1.1 Antenna Installation *7*
  2.1.2 Access Point Installation *8*
  2.1.3 Power Injector Installation *10*
2.2 Fixed WDOLS 2 – Equipment room 10

3 Bremerton Ferry Terminal Installation Instructions **11**

3.1 Fixed WDOLS 1 – Bremerton Ferry Terminal 11
  3.1.1 Antenna Installation *11*
  3.1.2 Access Point Installation *12*
  3.1.3 Power Injector Installation *12*

4 Kingston Ferry Terminal Installation Instructions (CR-068290) **13**

4.1 Fixed WDOLS 1 – Kingston Ferry Terminal 13
  4.1.1 Access Point Installation *14*
  4.1.2 Power Injector Installation *15*

5 Installation Guidelines to Remember **17**

Exhibits

List of Tables

Table 1: Acronyms and Abbreviations 5

List of Figures

Figure 1: Position of Antenna Mount and Roof Cable Entry Point 7
Figure 2: Non-penetrating Ballasted Tripod 8
Figure 3: Mounting Position of Access Point Bracket 9
Figure 4: Position of Antenna Mount and Roof Cable Entry Point 11
Figure 5: Desired Coverage Area 13
Figure 6: Antenna Location 14
Figure 7: Fixed WDOLS Access Point 15
Figure 8: Power Injector location 16

1 Introduction

This document is an installation procedure that provides fixed WDOLS installation instructions for the three Access Points (APs) (one rooftop mounted, one wall mounted, one server room mounted) that will be installed at Kitsap Transit (KT) for the Beta phase of the Central Puget Sound Regional Fare Coordination System (RFCS) project. This document also contains installation instructions for Phase 2 installations in future versions.

1.1 Purpose

The purpose of this document is to show how and where to install the Fixed WDOLS that will provide wireless connectivity to the buses that will be part of Beta. It is intended to show clearly where the Antenna mounting pole will be mounted, and by what means. It explains cable routing for the coaxial cable connecting the antenna to the Cisco 1242 AP and where and how to mount the AP. These details will be provided for the two Fixed WDOLS installations at the Kitsap Transit Main Base Bus Depot.

In addition, this document also shows how and where to install the Fixed WDOLS at the Bremerton Ferry terminal that will provide wireless connectivity for the Portable Fare Transaction Processor (PFTP) hand held units at that site.

The document will also show how and where to install the Fixed WDOLS at the Kingston Soundrunner terminal, providing PFTP connectivity to units at that site.

Comment [jb1]: CR-068290

1.2 Scope

This document will describe installation details for the two Fixed WDOLS installations at the KT Main Base, the single AP installation at the Bremerton Ferry Terminal, and the single AP installation at the Kingston Soundrunner office.

Comment [jb2]: CR-068290

Deleted: Bremerton Ferry Terminal

1.3 Terminology

This section contains a list of acronyms, abbreviations, and terms used in this document.

Table 1 contains the acronyms and abbreviations that are specific to ERG. Industry standard acronyms and abbreviations are not defined in this table.

Table 1: Acronyms and Abbreviations

Acronym or Abbreviation	Definition
AP	Access Point
BOC	Back Office Computer
BOM	Bill of Materials
CD	Configuration Data
DAC	Data Acquisition Computer
DDU	Driver Display Unit
KT	Kitsap Transit
OBFTP	On-Board Fare Transaction Processor

Acronym or Abbreviation	Definition
PFTP	Portable Fare Transaction Processor
UD	Usage Data
WDOLS	Wireless Data On/Off Loading System

1.4 References

[1] Day Wireless Site Survey Report
ERG Site Survey Report Final.pdf

2 KT Main Base Installation Instructions

Based on the site survey conducted by Day Wireless, one rooftop mounted Fixed WDOLS is required to be installed at the KT Main base in order to provide adequate coverage of the bus depot.

2.1 Fixed WDOLS 1 – Admin Building

The Fixed WDOLS will be installed in the northeast corner of the building. Figure 1 shows the intended position of the AP antenna on the roof of the building of the bus depot. The Omni-directional antenna will provide strong coverage and will allow the signal to propagate over the entire bus yard.

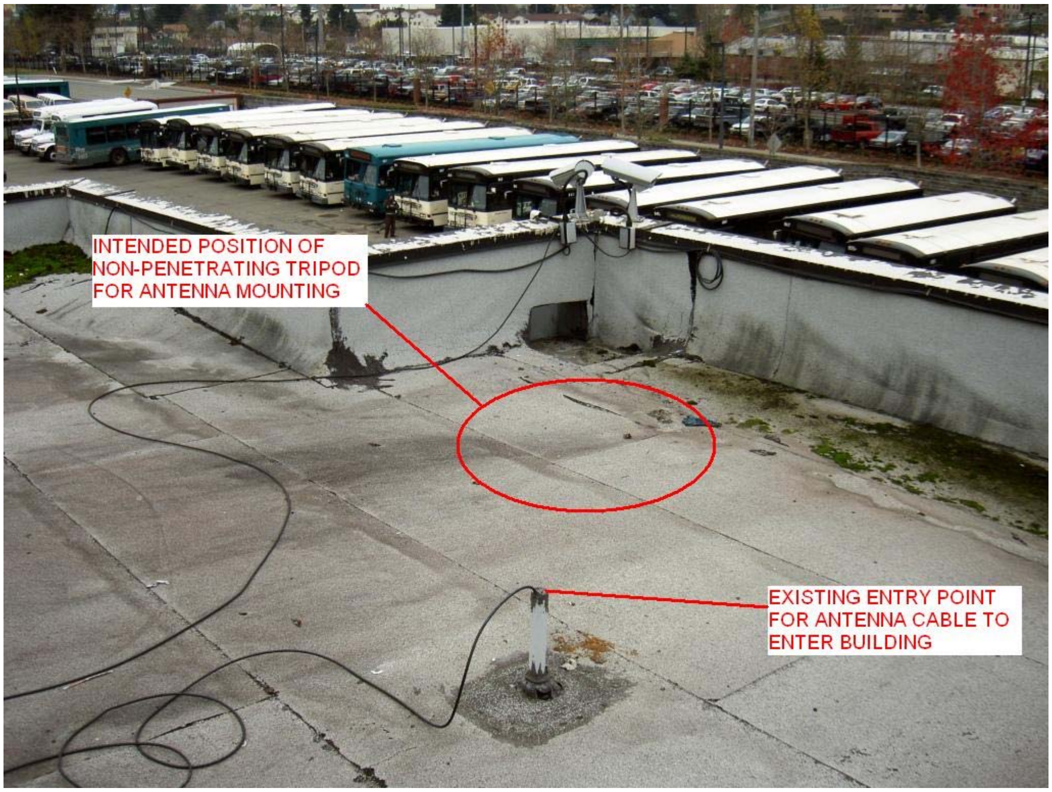

Figure 1: Position of Antenna Mount and Roof Cable Entry Point

2.1.1 Antenna Installation

This installation will use a non-penetrating ballasted mount (Figure 2) and will sit on the roof. This type of antenna mount is very versatile and allows for ease of installation as it is not necessary to drill holes in the roof of the building to secure the setup. Concrete blocks are used as ballast in order to secure the mount. The antenna will be mounted to this mast and will be adjusted for the correct down tilt and angle.

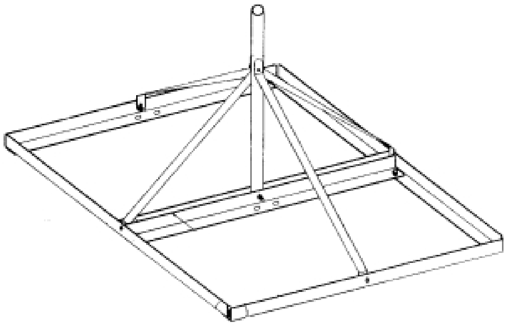

Figure 2: Non-penetrating Ballasted Tripod

Responsibilities for the work that will take place on the rooftop, as agreed by ERG and KT are:

- ERG will install the non-penetrating tripod.
- ERG will install the antenna and antenna cable.

2.1.2 Access Point Installation

The Cisco 1242 AP will be mounted in the roof space near where the antenna cable enters the ceiling. Figure 3 shows the approximate position where the AP bracket should be screwed to the wooden beam. The final position should be as close to where the antenna cable enters the building through the roof through the PVC pipe.

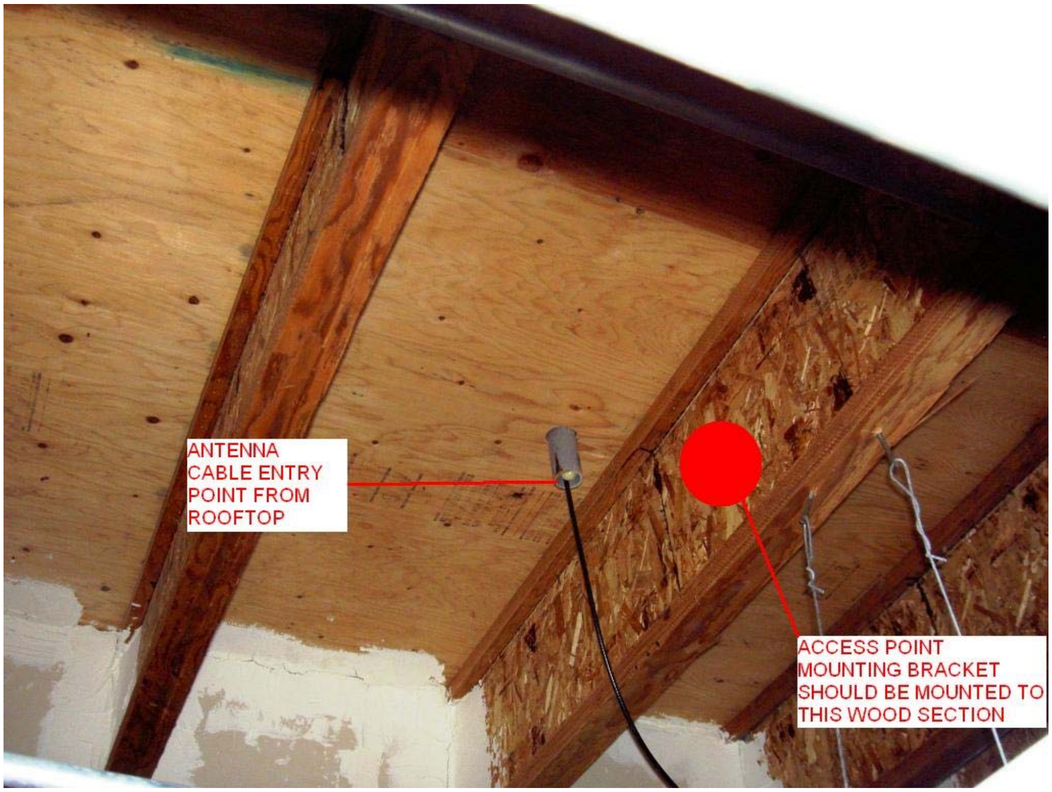
ANTENNA CABLE ENTRY POINT FROM ROOFTOP
ACCESS POINT MOUNTING BRACKET SHOULD BE MOUNTED TO THIS WOOD SECTION

Figure 3: Mounting Position of Access Point Bracket

Responsibilities for the work that will take place inside the building, as agreed by ERG and KT are:

- KT will install two Ethernet cables from the Access Point back to the equipment room to make the network connection. KT will determine the route of these cables. These cables must be Plenum Rated. KT will supply one Ethernet Cable; ERG will supply the other Ethernet Cable.
- ERG will supply and install Access Point bracket.
- ERG will mount Access Point to bracket and make cable connections.

2.1.3 Power Injector Installation

The Cisco 1242 Power Injector will be mounted in the equipment room where the network connection is made.

Responsibilities for the work that will take place inside the equipment room, as agreed by ERG and KT are:

- KT will provide 110VAC power outlet for the Power Injector power supply to plug into.
- ERG will supply and install the Power Injector and connect Ethernet cable previously run by KT.
- ERG will supply and install patch cable from Power Injector to network switch connection.

2.2 Fixed WDOLS 2 – Equipment room

A second Cisco 1242 AP must be installed in the equipment room that holds the Data Acquisition Computer (DAC). This AP will be mounted to the wall or can also sit in the equipment cabinet, whichever is preferred by KT.

Responsibilities for the work that will take place inside the equipment room as agreed by ERG and KT are:

- KT will provide 110VAC power outlet for the AP power supply to plug into.
- ERG will supply and install Cisco 1242 AP.
- ERG will supply and install patch cable to connect AP to network.

3 Bremerton Ferry Terminal Installation Instructions

Based on a site survey conducted by ERG and Kitsap Transit, one wall mounted Fixed WDOLS is required to be installed at the Ferry Terminal in order to provide adequate coverage of the area in which the PFTP devices will be present.

3.1 Fixed WDOLS 1 – Bremerton Ferry Terminal

The Fixed WDOLS will be installed on the side of the wall at the terminal as shown in Figure 4. Omni-directional antennas connected directly to the Cisco 1242 AP will provide strong signal coverage of the area required.

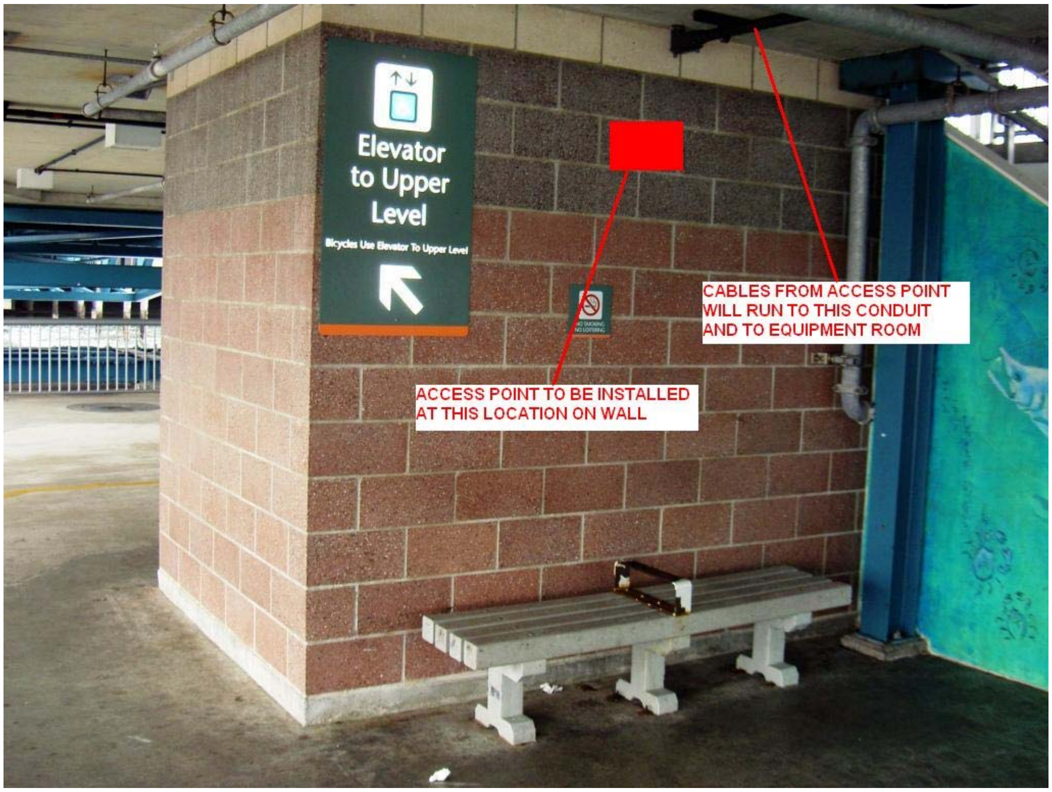
Elevator to Upper Level
Bicycles Use Elevator To Upper Level
CABLES FROM ACCESS POINT WILL RUN TO THIS CONDUIT AND TO EQUIPMENT ROOM
ACCESS POINT TO BE INSTALLED AT THIS LOCATION ON WALL

Figure 4: Position of Antenna Mount and Roof Cable Entry Point

3.1.1 Antenna Installation

This installation will use a pair of diversity antennas that will be connected directly to the antenna connections on the 1242 AP. No external antenna mount is required.

3.1.2 Access Point Installation

The Cisco 1242 AP will be mounted to the brick wall as shown in Figure 4. The exact position should be directly underneath the conduit that will hold the Ethernet cables. Once the AP is installed on the wall, a generic plastic box will be installed over the AP for protection from vandalism and weather.

Responsibilities for the work that will take place mounting the Access Point, as agreed by ERG and KT, are:

- KT will run short piece of conduit to extend existing conduit to AP position on wall as shown.
- KT will install two Ethernet cables from the Access Point back to the equipment room to make the network connection. KT will determine the route of these cables. These cables must be Plenum Rated. KT will supply one Ethernet Cable; ERG will supply the other Ethernet Cable.
- ERG will supply and install Access Point bracket.
- ERG will mount Access Point to bracket and make cable connections.
- ERG will supply and install plastic box covering the AP for protection.

3.1.3 Power Injector Installation

The Cisco 1242 Power Injector will be mounted in the equipment room where the network connection is made.

Responsibilities for the work that will take place inside the equipment room, as agreed by ERG and KT are:

- KT to provide 110VAC power outlet for the Power Injector power supply to plug into.
- ERG will supply and install the Power Injector and connect Ethernet cable previously run by KT.
- ERG will supply and install patch cable from Power Injector to network switch connection.

4 Kingston Ferry Terminal Installation Instructions (CR-068290)

Comment [jb3]: Section added to include installation for SoundRunner Base WDOLS (CR-068290)

Based on a site survey conducted by VIX and Kitsap Transit, one wall mounted Fixed WDOLS is required to be installed at the Ferry Terminal in order to provide adequate coverage of the area in which the PFTP devices will be present.

4.1 Fixed WDOLS 1 – Kingston Ferry Terminal

The Fixed WDOLS will be installed on the wall inside the ticket office at the terminal as shown in Figure 6. A 45° antenna mounted on the ticket office and connected directly to the Cisco 1242 AP will provide strong signal coverage within the required area. See Figure 5.

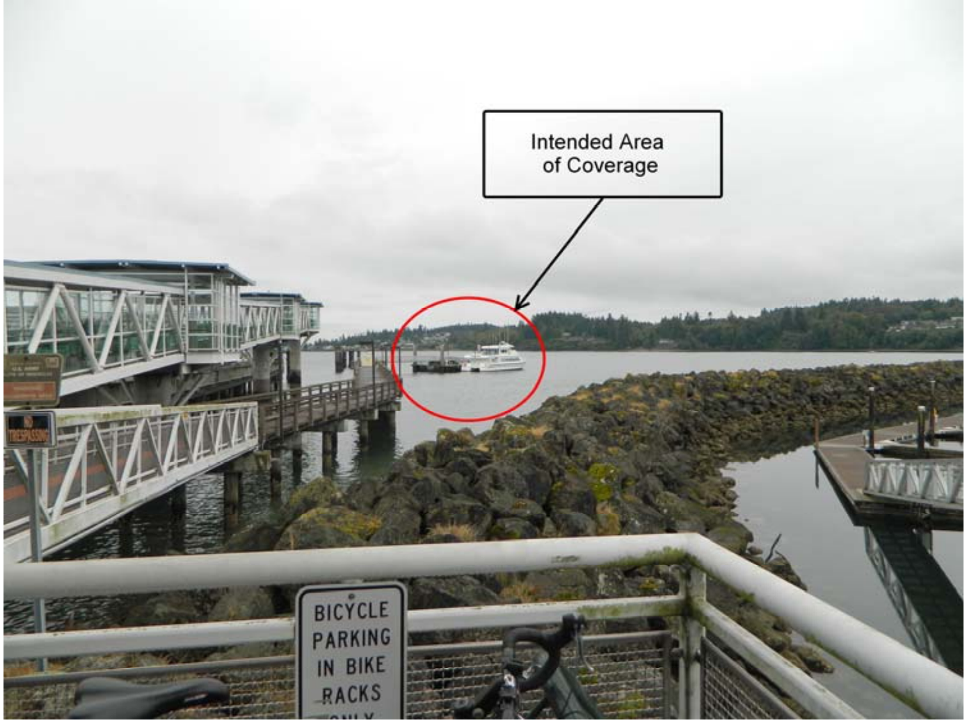

Figure 5: Desired Coverage Area

This installation will use a 45° antenna mounted to an antenna mast installed on the ticketing office. The antenna will be connected directly to the antenna connection on the 1242 AP.

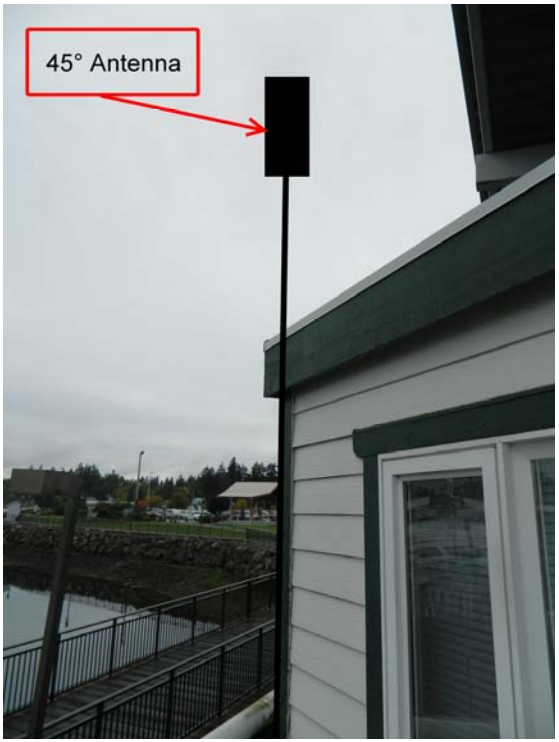

Figure 6: Antenna Location

4.1.1 Access Point Installation

The Cisco 1242 AP will be mounted to the wall as indicated in Figure 7. The AP is located in the ticketing office in a metal enclosure beneath the desk and next to the conduit containing the Ethernet cables.

Responsibilities for the work that will take place mounting the Access Point, as agreed by VIX and KT, are:

- KT will install two Ethernet cables from the Access Point back to the equipment room to make the network connection. KT will determine the route of these cables. These cables must be Plenum Rated and will be supplied by KT.
- VIX will supply and install Access Point bracket.
- VIX will mount Access Point to bracket and make cable connections.
- KT will supply and install a suitable enclosure for the AP for protection.

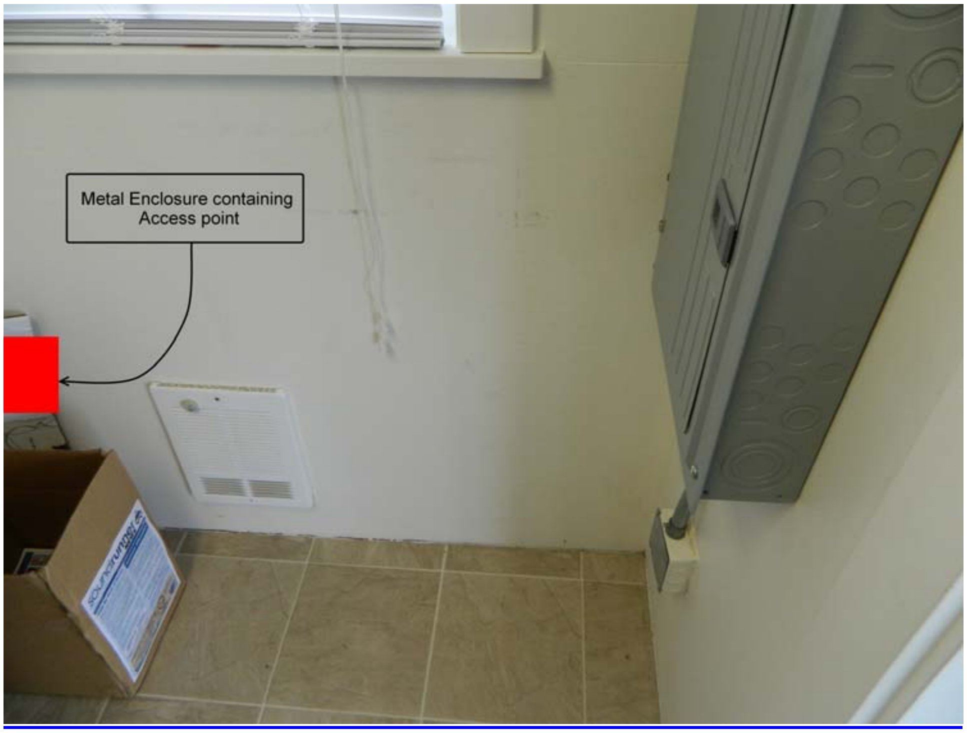

Figure 7: Fixed WDOLS Access Point

4.1.2 Power Injector Installation

The Cisco 1242 Power Injector will be mounted in the equipment room where the network connection is made, reference Figure 8.

Responsibilities for the work that will take place inside the equipment room, as agreed by VIX and KT are:

- KT to provide 110VAC power outlet for the Power Injector power supply to plug into.
- VIX will supply and install the Power Injector and connect Ethernet cable previously run by KT.
- VIX will supply and install patch cable from Power Injector to network switch connection.

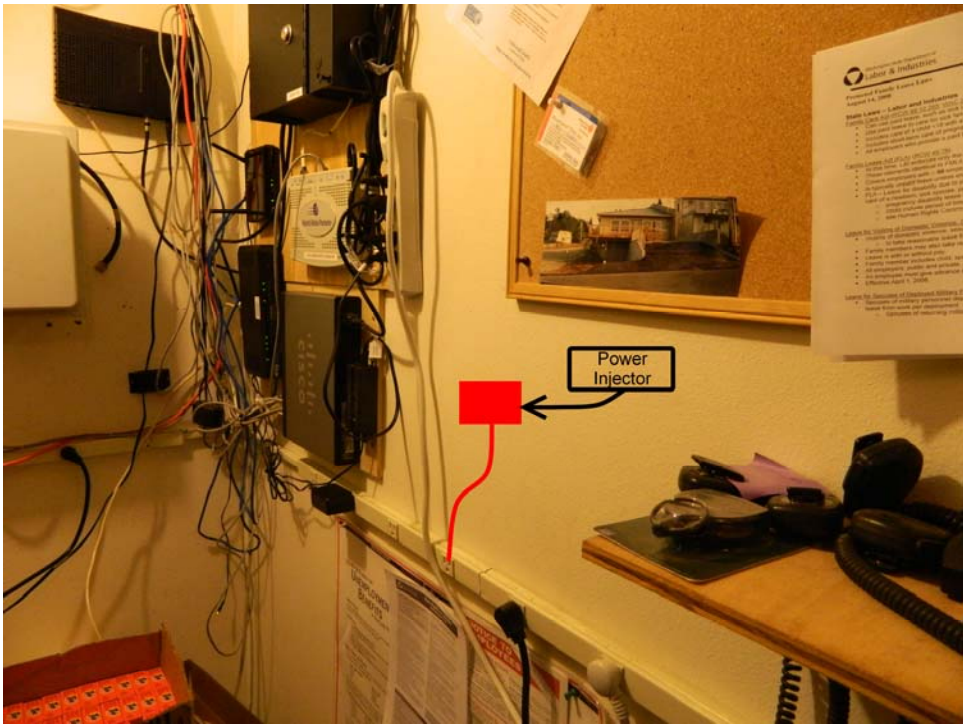

Figure 8: Power Injector location

5 Installation Guidelines to Remember

- Two Ethernet cables are run from the AP to the Network Equipment room. One cable is supplied and installed by KT; it is this cable that is connected to the KT network. The other cable is run to allow remote console communications to the AP from the equipment room, eliminating the need to access the AP through the roof. **The Ethernet cable used must be Plenum rated!**
- The Antenna cable has a diameter of 5/8 inch, and has a minimum bend radius of **1.5 inches.** This cable has quite a good minimum bend radius rating, but should be considered for installation.
- The maximum length the antenna cable can be is 20 feet. This should be considered when mounting the AP bracket in relation to the intended position of the mounted antenna.
- The AP bracket should be secured by at least two screws. The AP weighs approximately two pounds.